Indian Maritime University

(A Central University, Govt of India)

End Semester Examinations – June 2023

Programme Name: B Tech (ME)

Semester: VII

Subject Code: UG11T3607

Subject Name: Marine Steam Engineering

Date:07.06.2023	Max Marks: 70
Duration: 03 Hrs	Pass Marks: 35

General Instructions

(i) All Sections (A, B & C) are to be attempted.
(ii) Options, if any, are specified in respective section.

Section A

MCQs of 01 Mark each – Choose the correct answer as applicable.

1. Impulse turbines speed compared to reaction turbines is
(a). lower speed
(b). higher speed
(c). same speed
(d). not comparable

2. For the gear of the gear wheel, the radial depth of tooth from pitch circle to tip circle is called
(a) addendum
(b) dedendum
(c) pitch
(d) none of the above

3. The bellow one is used to secure the turbine blades
a. Lacing wire
b. Winding wire
c. sling wire
d. None of the above

4. Metallic packing rings are installed in turbine diaphragms to prevent _____.
a. Air from entering the turbine casing.
b. Pressure build-up on both sides of diaphragm
c. inter stage steam leakage along the shaft
d. steam from escaping to the atmosphere

5.The velocity of the steam at exit from the nozzle is generated by converting heat energy into
(a) Potential energy
(b) Kinetic energy
(c) static energy
(d) none of the above

6.The reason for warmup the turbine before starting is
(a) to avoid less clearance between blade and casing
(b) to avoid less clearance in the bearings
(c) to avoid less clearance between casing and gland
(d) All of the above

7. The following is not a reason for high bearing temperature in steam turbine.
(a) low oil pressure
(b) bearing clearance is within limit.
(c) Dirt presence in the oil
(d) wrong assembly of bearing

8. Erosion damage in steam turbine blades is reduced by brazing a _____ strip down the back of the leading edge of the blade.
(a) Brass
(b) stellite
(c) Copper
(d) aluminium

9. Water contamination from steam packed glands or condensation in the gear box leads to
a. fluid breakdown
b. Emulsification of lube oil
c. Caking of Lube oil
d. All of the above

10. A local breakdown of oil film between mating gears is _____.
a. Scuffing
b. Crack
c. Dent
d. Pitting

Section B

Five Questions of 02 Marks each

11. State the advantages of a reheat turbine?

12. What is the function of a quill shaft?

13. Why do steam turbines are fitted with sliding foot?

14. write short notes on vibrations in marine steam turbines.

15. Explain why great care should be taken in cleaning air ejector nozzles?

Section C

Seven Questions of 10 Marks each of which any 05 questions to be answered.

16. (a) What are the advantages and disadvantages of a steam turbine over a steam reciprocating engine?(4 Marks)

(b) Draw neatly and label the general arrangement of a marine steam turbine propulsion system showing the following

a) The flow of steam from boiler to steam turbine
b) The return of condensate from condenser to boiler
c) Lubricating oil flow from sump to gravity tank and back to sump through bearings (6 marks)

17 a) With the help of suitable diagram explain the arrangement of a pressure compounded impulse turbine. The change in pressure and velocity from inlet to exhaust is to be indicated. (A four stage turbine with all stages having the same mean blade diameter may be considered) (7 marks)

(b)Explain the reason for incorporating a "Curtis" stage at the HP inlet(3marks)

18. (a) With the help of a suitable diagram explain main steam turbine gland sealing system. (6 marks)
(b) Explain why "Partial admission" is employed in some turbine arrangements. (4 marks)

19. a) With the help of suitable diagram explain the function and fixing arrangement of a steam turbine Diaphragm. (6 Marks)

b) What are rubbing strips? Explain their function with the help of a neat and clean sketch.(4 Marks)

20. Describe a double casing steam turbine. State the advantages. (4 Marks)

(b)With the help of a suitable diagram explain lubricating oil system for a steam turbine reduction gear for a steam propelled ship. (Marks 6)

21 (a) Explain the gear arrangement – "Single tandem" and "Dual tandem" and bring out the advantages and disadvantages of the two (Marks 5)

(b)Draw a neat sketch of a regenerative condenser and explain the objectives of tube arrangement(5 marks)

22 a) What are the various types of losses in a steam turbine? Marks 5

b) Describe the methods of leak detection in tubes of a vacuum condenser. (Ultrasonic, Fluorescent and vacuum test) (5 Marks)